



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,170	10/12/2001	Jared Zerbe	1726.7220801	1973
7590	02/17/2004		EXAMINER	
Thomas E. Anderson Hunton & Williams LLP 1900 K Street, NW. Washington, DC 20006-1109			TRIMMINGS, JOHN P	
			ART UNIT	PAPER NUMBER
			2133	8
DATE MAILED: 02/17/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .	Applicant(s)
09/976,170	ZERBE ET AL.
Examiner	Art Unit

John P Trimmings 2133

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 12 October 2001.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-88 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-53,56-65,68-88 is/are rejected.
 7) Claim(s) 54,55,66 and 67 is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 12 October 2001 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date 2-6/13/2002.

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
 5) Notice of Informal Patent Application (PTO-152)
 6) Other: _____.

DETAILED ACTION

Priority

The examiner acknowledges applicant's priority date of 02/02/2001.

Information Disclosure Statement

The examiner has considered the references listed in applicant's Information Disclosure Statement.

Drawings

1. The drawings are objected to because FIG.19 1911, 1912, and 1913 are not mentioned in the disclosure. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to because FIG.20 2011, 2012, and 2013 are not mentioned in the disclosure. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
3. The drawings are objected to because FIG.28 2805 is not mentioned in the disclosure. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to because FIG.31 3111 is not mentioned in the disclosure. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

1. The abstract of the disclosure is objected to because it contains more than 150 words. Correction is required. See MPEP § 608.01(b).
2. The disclosure is objected to because of the following informalities: page 20 line 4 should read, "terminal 1911 of current source 1912. A second terminal 1913 of current source 1920...". Appropriate correction is required.
3. The disclosure is objected to because of the following informalities: page 20 line 22 should read, "terminal 2011 of current source 2012. A second terminal 2013 of current source 2012...". Appropriate correction is required.

4. The disclosure is objected to because of the following informalities: page 28 line 28 should read, "may be performed at many different times.". Appropriate correction is required.
5. The disclosure is objected to because of the following informalities: page 34 line 5 should read, "when step 3209 occurs.". Appropriate correction is required.
6. The disclosure is objected to because of the following informalities: page 37 line 4 recites, "An output of even receiver..." but the examiner believes that it should read, should read, "An output of odd receiver...". Appropriate correction is required.
7. The disclosure is objected to because of the following informalities: page 42 line 4 should read, "A serial data output of the shift register...". Appropriate correction is required.

Claim Objections

8. Claims 54, 55, 66, and 67 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is an examiner's statement of reasons for allowance: The prior arts of record teach transmit and receive circuits with data storage elements, with test mode loading of storage elements in parallel, but they fail to teach, singly or in combination, both storage and sub-storage elements, and the sub-storage elements being added in test mode, and also the loading of a test pattern through the data path. Therefore, the examiner would favor the allowance of these claims under the above-mentioned conditions.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claim 82 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The examiner interprets the claim to mean that the same receiver that receives normal data transmitted from a transmitter is not used in receiving test data from the transmitter. In other words the examiner believes that the applicant specifies that there may be a dedicated "test" receiver for the transmit test mode, and the disclosure does not contain this limitation.

10. Claim 88 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The examiner interprets the claim to mean that the same transmitter that transmits normal data received at a receiver is not used in transmitting test data to the receiver. In other words the examiner believes that the applicant specifies that there may be a dedicated "test" transmitter for the transmit test mode, and the disclosure does not contain this limitation.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Only one medium is mentioned in the dependent Claim 18, and the second line of this claim is unintelligible, and so the claim is indefinite.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical

Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

12. Claims 77-81 and 83-87 are rejected under 35 U.S.C. 102(e) as being anticipated by Brian Johnson, U.S. Patent No. 6606041.

As per Claim 77:

Johnson teaches a method for operating a transmit circuit first passing data through the transmit end (FIG.2 DQ to 51 to 59 to 63 to SRAM) in a normal operating mode, and to provide for evaluation of a digital signal (column 12 lines 5-13 and circuit of FIG.6) by generating a repeating pattern (FIG.6 connected to DQ) when in test mode.

As per Claim 78:

Based on Claim 77, this claim is rejected because Johnson teaches that generating the repeat patter comprises a preload of the pattern (FIG.8 105) which is pre-loaded into the transmitter (FIG.6 and column 8 lines 53-61).

As per Claim 79:

Dependent on Claim 77, the claim specifies that generating the repeating pattern comprises uniting the pipeline structures (Johnson FIG.2 51, 59, 63) with the pattern generator (FIG.6 is connected to DQ line of FIG.2) when in test mode, and is therefore anticipated.

As per Claim 80:

Dependent on Claim 79, wherein when in normal mode, data passes through the transmit pipeline (Johnson anticipates this in FIG.2 51, 59, 63), and so the claim is rejected.

As per Claim 81:

Dependent on Claim 77, wherein Johnson teaches receiving data in the receive circuit (FIG.2 65, 61, 49, 47) in normal mode, and receiving the repeating data (same path) when operating in test mode. In other words, the DRAM bank, containing the repeating data inserted by the transmitter, is the medium.

As per Claim 83:

Johnson teaches a method for operating a receiver circuit first passing data through the receive end (FIG.2 SRAM to 61 to 49 to 47 to DQ) in a normal operating mode, and to provide for generation of a receive repeating pattern (FIG.8 107) when in test mode (FIG.8 connected to DQ).

As per Claim 84:

Based on Claim 83, this claim is rejected because Johnson teaches that generating the repeat patter comprises a preload of the seed (FIG.8 105) which is pre-loaded into the next state generator (FIG.8 107).

As per Claim 85:

Dependent on Claim 83, the claim specifies that generating the repeating pattern comprises uniting the pipeline structures (Johnson FIG.2 61, 49, 47) with the receive pattern generator (FIG.8 is connected to DQ line of FIG.2) when in test mode, and is therefore anticipated.

As per Claim 86:

Dependent on Claim 85, wherein when in normal mode, data passes through the receive pipeline (Johnson anticipates this in FIG.2 61, 49, 47 to DQ), and so the claim is rejected.

As per Claim 87:

Dependent on Claim 83, wherein Johnson teaches transmitting data to the receive circuit (FIG.2 65, 61, 49, 47) in normal mode, and transmitting the repeating data (same path) when operating in test mode. In other words, the DRAM bank, containing the repeating data inserted by the transmitter, is the medium.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 1, 3, 4, 9, 10, 41 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847.

As per Claim 1:

Gauthier et al teaches a method of testing a circuit by first generating a repeating transmission pattern, transmitting the pattern to a receiver, generating a receive pattern, and comparing the two patterns (see column 5 lines 23-43). Gauthier however does not teach the adjustment of a parameter that affects reception of the repeating pattern. In an analogous art, Chao et al. does teach this limitation (see Abstract and column 6 lines 11-55). In testing of I/O devices, Chao et al. asserts that timing adjustments between transmitter and receiver need to be more closely controlled (column 1 lines 11-63) by the referenced invention. And one with ordinary skill in the art at the time of the invention, motivated by Chao et al., would find it obvious to combine the two inventions, and so the claim is rejected.

As per Claims 3 and 4:

Dependent on Claim 1, the parameter adjustments are transmit and receive clocks. Chao et al., adjusts each clock separately (see Fig.5 and column 6 lines 11-55), and in view of the motivation for Claim 1, the claims 3 and 4 are rejected.

As per Claim 9:

This claim limits Claim 1 to utilizing a shift register to generate the transmit signal. Gauthier et al., in FIG.1 shows such a register (FIG.1 10), and in view of the motivation of Claim 1, this claim is rejected.

As per Claim 10:

This claim further limits Claim 9 to a linear feedback shift register. Gauthier et al., in the Abstract, describes such a register, and in view of the motivation of Claim 9, this claim is rejected.

As per Claim 41:

The claim, dependent on Claim 1, compares the transmit with the receiver data detecting non-repeatability. Gauthier et al., in FIG.1 shows the circuit that performs this function (FIG.1 60), and in view of the motivation of Claim 1, the claim is rejected.

As per Claim 46:

Dependent on Claim 1, the claim limits the transmit and receive circuits to being part of the same system. Gauthier et al. teaches this in FIG.1, and in view of the motivation of Claim 1, this claim is rejected.

14. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as

applied to Claim 1 above, and further in view of Whitworth et al., U.S. Patent No. 6331787. The claim limits Claim 1 to a termination parameter adjustment. Whitworth et al., teaches such an adjustment in column 3 lines 65-67 and column 4 lines 1-33. Also, as described in column 3 lines 58-63, Whitworth et al. cites improved termination of transmission lines thereby. One with ordinary skill in the art at the time of the invention, motivated as suggested by Whitworth et al. to improve signals with low operating voltages, would combine all references, and so the claim is rejected.

15. Claims 5, 14, 15, 16, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Foland et al., U.S. Patent No. 5761212. The claims limit Claim 1 to an input receiver window parameter adjustment, done at the receiver. Foland et al., in an analogous art, teaches programmable windows (see Foland et al. Abstract and column 3 lines 30-48) being applied over a range, which then affect optimization of the quality of the channel under test. And in column 1 line 1-10, Gauthier et al. describes the testing to occur within transmission paths (a common medium). And in column 2 lines 61-67, Foland states that channel quality can be continuously monitored and optimized in this invention, and so evaluation occurs at every iteration of the transmit signal. One with ordinary skill in the art at the time of the invention, motivated by Foland et al., would combine the art, and so the claims are rejected.

16. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as

applied to Claim 1 above, and in view of Foland et al., U.S. Patent No. 5761212 as applied to Claim 16 above, and further in view of Philip R. Couch, U.S. Patent No. 4475210. The claim limits Claim 16 to constructing a waveform based on the comparison. A circuit used for the purpose of evaluating signal quality is taught by Couch (column 1 lines 1-8), and presents a waveform for viewing in the form of an "eye-diagram". An advantage to this invention is to predict error rates, according to column 1 lines 25-33. One with ordinary skill in the art at the time of the invention, motivated to provide such a visual aid, would combine the references above, and so the claim is rejected.

17. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Sakoda et al., U.S. Patent No. 6230022. The claim limits Claim 1 to output drive level parameter adjustment. Sakoda et al., in an analogous art, teaches improved communication by controlling the power used within the signal being transmitted (column 2 lines 60-67 and column 3 lines 1-60) on a real time basis. In column 2 lines 53-58, Sakoda et al. describes the invention as improving on signal quality. One with ordinary skill in the art at the time of the invention, motivated to improve signal quality, would combine the art, and so the claim is rejected.

18. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of John Brian Terry, U.S. Patent No. 6055297. The claim limits Claim 1 to a crosstalk cancellation parameter adjustment.

Terry, in column 3 lines 32-52 describes optimizing a communications system by monitoring crosstalk. In column 2 lines 5-26, Terry describes the advantage of the invention as permitting new and old systems to be installed together. One with ordinary skill in the art at the time of the invention, motivated by Terry, would find it obvious to combine all references, and so the claim is rejected.

19. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Liau et al., U.S. Patent No. 6650698. The claim limits Claim 1 to an equalization parameter adjustment. Liau et al., in the Abstract, describes a system whereby equalization is performed on received data using a feedback coefficient that is constantly being updated. In column 1 lines 30-52, Liau et al. describes the advantage of the invention to be a decrease in errors in a communications system. One with ordinary skill in the art at the time of the invention, motivated by Liau et al., would combine the references, and so the claim is rejected.

20. Claims 11, 31-35, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Maddux et al., U.S. Patent No. 6421801.

As per Claim 11:

The claim limits Claim 1 to transmitting the signal with reference to ground. In an analogous art, Maddux et al., shows that in FIG.4, D_{IN} is the data into the receiver, and the signal is referenced to VSS (ground). Also, advantages to Maddux et al., as

described in column 1 lines 10-35, are the capability to control clock timing in order to improve circuit response. One with ordinary skill in the art at the time of the invention, motivated to improve circuit performance, would combine this art with Claim 1, and so the claim is rejected.

As per Claims 31 and 38:

The claims limit Claim 1 to transmitting the signal frequency as a multiple of the receiver frequency. Maddux et al., in column 5 lines 52-65 teaches this, and in the same lines describes the advantage as being easier to measure at the receiver side. One with ordinary skill in the art at the time of the invention, motivated to improve testing of the circuit, would combine the references, and so the claims are rejected.

As per Claim 32:

Dependent on Claim 31, this claim sets the two frequencies to an equal period. This is already taught by Gauthier et al. in FIG.1 18 wherein the clock that drives both LFSRs is a common clock to each. And in view of the motivation previously stated, this claim is rejected.

As per Claim 33:

Dependent on Claim 31, this claim limits comparing patterns to multiple instances. This is already taught by Gauthier et al. in the Abstract wherein the testing occurs in a free-running mode, and so continues for an indefinite number of instances. And in view of the motivation previously stated, this claim is rejected.

As per Claim 34:

Dependent on Claim 33, this claim limits adjustment of a parameter in the transmit circuit. This is already taught by Maddux et al., in the Abstract wherein the transmit clock is adjusted. And in view of the motivation previously stated, this claim is rejected.

As per Claim 35:

Dependent on Claim 33, this claim limits adjustment of a parameter in the receive circuit. This is already taught by Chao et al., in Fig.5 wherein the receive clock is adjusted by receive clock align/misalign. And in view of the motivation previously stated, this claim is rejected.

21. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of John S. Prentice, U.S. Patent No. 6674998. The claim limits Claim 1 to transmitting the signal as a differential signal. Prentice, in an analogous art, provides for improved phase error performance (column 2 lines 40-45) in differential signal propagation (column 1 lines 19-24). Therefore, one with ordinary skill in the art at the time of the invention, motivated to improve the signal, would combine the art of Prentice, and so the claim is rejected.

22. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Semyon Berkovich, U.S. Patent No. 5369755. The claim limits Claim 1 to transmitting the signal as a multi-bit signal (two bits of information on one conductor). In an analogous art, Berkovich provides for multi-bit

data to be transmitted (column 2 lines 7-10) using prior art called content induced transaction overlap (column 1 lines 15-67). An advantage, as in column 2 lines 34-35, is data compression, and one with ordinary skill in the art at the time of the invention, motivated to improve data compression, would combine Berkovich with Claim 1, and so this claim is rejected.

23. Claims 20-22, 24-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, in view of Foland et al., U.S. Patent No. 5761212 as applied to Claim 19 above, and further in view of Johnson et al., U.S. Patent No. 6606041. The Claims 20-22 limit Claim 19 to a common medium being a data line, an address line, and a control line. In an analogous art, Johnson et al. uses a recurring (pseudo-random) pattern to drive data, address, and control lines (column 2 lines 61-67, column 3 lines 1-67, column 4 lines 1-62) in a memory test environment, citing an improved calibration result (column 1 lines 5-10). The examiner notes here that Claims 24-26 are dependent on a claim which is rejected under 35 USC 112(2), but are worded the same as Claims 20-22, and so, the examiner has taken the liberty to similarly reject Claims 24-26. As for Claim 27, which is dependent also on the same rejected claim, this claim uses a common medium. And Claims 28-30, based on the same rejected claim, also use the data, address and control lines of Johnson et al. in the optimization of the circuit. One with ordinary skill in the art at the time of the invention, motivated by Johnson et al., would combine all references, and so the claim is rejected.

24. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and in view of Foland et al., U.S. Patent No. 5761212 as applied to Claim 18 above, and further in view of Komatsu et al., U.S. Patent No. 6631486. This claim, being dependent on claims 18 and 1, is interpreted by the examiner to mean that one medium is used for data output, and one is used for the repeating pattern. In an analogous art, Komatsu et al. uses such a configuration (see Fig.1 24, and Fig.3 34), and discloses the advantage of being able to test at high frequencies (column 2 line 1-62). Based on the examiner's interpretation of the claim, and the motivation and reference of Komatsu et al., the claim is rejected based on combining the references. Although the examiner does not see any reference to this capability in the disclosure, the benefit of a doubt is extended to the applicant, and the examiner asks that the applicant show to the examiner citations within the disclosure describing such an arrangement.

25. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and in view of Maddux et al., U.S. Patent No. 6421801 as applied to Claim 35 above, and further in view of Johnson et al., U.S. Patent No. 6606041. The claims limit the receiving of data by way of a 1st and a 2nd medium. Johnson et al., outlines such an arrangement in FIG.1 and column 4 lines 25-53. And in view of the motivation of Johnson previously noted in Claim 20 above, the claims are rejected.

26. Claims 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Foland et al., U.S. Patent No. 5761212 as applied to Claim 5 above, and further in view of Sakoda et al., U.S. Patent No. 6230022 as applied to Claim 6 above. The claims specify two distinctly differing parameter applications with the objective of evaluating and optimizing signals by comparing at the receiver. Claims 5 and 6 above are examples of a 1st and a 2nd parameter application, and one with ordinary skill in the art at the time of the invention, motivated as outlined in Sakoda et al. and Foland et al., would combine the two references with Claim 1, and so the claims are rejected.

27. Claims 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claims 1 and 41 above, and further in view of Johnson et al., U.S. Patent No. 6606041.

As per Claim 42:

Dependent on Claim 41 above, this claim limits the method to optimizing repeatability by adjusting a parameter. Johnson et al. et al. teaches this task in the Abstract, and in view of the motivation for Johnson et al. above, this claim is rejected.

As per Claim 43:

Dependent on Claim 1 above, the claim limits the comparing of transmit to receive to occur at system start up. Johnson et al., in column 1 lines 34-39 teaches this feature, and in view of the previous motivation for Johnson, this claim is rejected.

28. Claims 44, 45, 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al., U.S. Patent No. 5228042, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Jalali et al., U.S. Patent No. 6154659.

As per Claim 44:

Dependent on Claim 1 above, the claim limits the comparing of transmit to receive to occur at the time of an error detection. Jalali et al., in the Abstract teaches such a feature, wherein after detecting a failure of signal-to-noise at the receiver, a parameter is passed back to the transmitter in order to adjust power, and in column 5 lines 30-39 recites the advantage of better performance to this feature. One with ordinary skill in the art at the time of the invention, motivated to better performance, would combine the references, and so the claim is rejected.

As per Claim 45:

This claim is similar to Claim 44 in that the occurrence of this type of testing is occasional. The examiner interprets this in that the same initiation of a power adjustment feedback order as in Claim 44 above by the receiver may occur on an occasional basis. In other words, the time between separate requests by the receiver may be minutes, or even hours apart, depending on many variable factors. And, in view of the motivation of Claim 44 above, this claim is rejected.

As per Claims 47 and 48:

Based on Claim 1, these claims limit the transmit and receive units to being located external to each other. In Jalali et al., this is taught also within the Abstract,

wherein a receiver senses the need for a change, and requests via the medium, a parameter change in the transmitter, each unit being separated by the medium. In view of the motivation previously given for Jalali et al., the claims are rejected.

29. Claims 49-53, and 56, are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerowitz et al., U.S. Patent No. 6222380, in view of Gauthier et al., U.S. Patent No. 5228042.

As per Claim 49:

Gerowitz et al. teaches a transmit data storage element (FIG.2 L1, L2, L3, L4) adapted to receive data from a transmit data input (FIG.2 D0, D1, D2, D3) to be sequentially transmitted as transmit data out when operating in normal mode (FIG.2 Q). But, Gerowitz et al. does not teach a repeating pattern in a test mode. However, in an analogous art, Gauthier et al. does teach providing a repeating pattern (FIG.1 5) in a test mode (FIG.1 Control Circuit 30) and transmitting the data out. By joining the multiplexers of the two references, (Gauthier et al. FIG.1 15 and Gerowitz et al. FIG.2 21), one would have a data storage element consisting of both latches (in Gerowitz et al.), and a shift register (in Gauthier et al.), and one would be able to provide a sequentially transmitted repeating pattern in test mode, or normal data when not in test mode. Gauthier et al., in column 1 lines 43-52 states as an advantage an improved method and circuit for test, utilizing less test hardware memory. One with ordinary skill in the art at the time of the invention, motivated as indicated by Gauthier et al., would combine the two references, and so the claim is rejected.

As per Claim 50:

Dependent on Claim 49, the storage element is a shift register (Gauthier et al., FIG.1 10), as well as a data latch, and in view of the motivation of Claim 49, this claim is rejected.

As per Claim 51:

Dependent on Claim 49, when in test mode, the transmit storage element (Gauthier et al., FIG.1 5) provides the repeating pattern (column 3 lines 5-35), and in view of the motivation in Claim 49, the claim is rejected.

As per Claim 52:

Dependent on Claim 49, the repeating pattern of Gauthier et al., at $2^{15} - 1$ (column 3 line 67) is much larger than the data capacity of the storage element, which is 10 bits in length (FIG.2 10), and in view of the motivation of Claim 49, the claim is rejected.

As per Claim 53:

Dependent on Claim 49, the transmit storage element stores each data bit (see Gauthier et al., FIG.1 10), and in view of the motivation of Claim 49, the claim is rejected.

As per Claim 56:

Dependent on Claim 49, the transmit storage element is loaded from another source other than data input (see Gauthier et al., column 4 lines 3-13), and in view of the motivation of Claim 49, the claim is rejected.

30. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerowitz et al., U.S. Patent No. 6222380, in view of Gauthier et al., U.S. Patent No. 5228042 as

applied to Claim 49 above, and further in view of the applicant's admitted prior art. This claim limits the transmit circuit wherein the storage element is parallel loaded (see applicant FIG.2 nodes 207, 209, 211, and 213), and based on prior motivation, the claim is rejected.

31. Claim 58 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerowitz et al., U.S. Patent No. 6222380, in view of Gauthier et al., U.S. Patent No. 5228042, as applied to Claim 49 above, and further in view of Jalali et al., U.S. Patent No. 6154659. Dependent on Claim 49, the transmit circuit receives an adjustment signal from the receiver circuit, and adjusts a parameter (see Jalali et al. Abstract), and in view of the motivation of Claim Jalali et al. previously stated, the claim is rejected.

32. Claim 59 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerowitz et al., U.S. Patent No. 6222380, in view of Gauthier et al., U.S. Patent No. 5228042, and in view of Jalali et al., U.S. Patent No. 6154659 as applied to Claim 58 above, and further in view of Johnson et al., U.S. Patent No. 6606041. Dependent on Claim 58, where the receive circuit is embodied in two memory circuits. Johnson et al., in FIG.1 11a and 11n, defines at least two memory circuits as being receivers of test patterns, and based on the previous motivation of Johnson et al., the claim is rejected.

33. Claim 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerowitz et al., U.S. Patent No. 6222380, in view of Gauthier et al., U.S. Patent No. 5228042, and in view of Jalali et al., U.S. Patent No. 6154659 as applied to Claim 58 above, and in view of Johnson et al., U.S. Patent No. 6606041 as applied to Claim 59 above, and further in view of Wei-Lun Chen, U.S. Patent No. 6003118. Dependent on Claim 59,

wherein the transmitter adjusts to a 1st value for the 1st memory, and to a 2nd value for a 2nd memory. In an analogous art, Chen teaches a memory system calibration circuit and method wherein each memory module feeds back in a phase lock loop to the memory controller, where actual adjustment to each clock associated with each memory is made (column 2 lines 40-67 and column 3 lines 1-15). Chen, in column 2 lines 6-20 describes the advantages to the invention based on new and higher clocking frequencies of memory devices. One with ordinary skill in the art at the time of the invention, motivated by Chen, would combine the arts and so the claim is rejected.

34. Claims 61-65, 68 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Makoto Koga, U.S. Patent No. 6222380, in view of Gauthier et al., U.S. Patent No. 5228042.

As per Claim 61:

Koga teaches a receive data storage element (FIG.1 C8, C9, C10, C7) adapted to output data from a receive data input (FIG.1 DATA) when operating in normal mode. But, Koga does not teach a comparison element in a test mode. However, in an analogous art, Gauthier et al. does teach providing a comparison element (FIG.1 60) in a test mode (FIG.1 Control Circuit 30), comparing the received with the expected producing an output signal (FIG.1 62). By joining the two references, (Gauthier et al. FIG.1 21 and Koga FIG.1 DATA), one would have a data storage element consisting of both latches (in Koga) and a shift register (in Gauthier et al.), and one would be able to evaluate a transmitted repeating pattern in test mode, or normal data when not in test mode. Gauthier et al., in column 1 lines 43-52 states as an advantage an improved

method and circuit for test, utilizing less test hardware memory. One with ordinary skill in the art at the time of the invention, motivated as indicated by Gauthier et al., would combine the two references, and so the claim is rejected.

As per Claim 62:

Dependent on Claim 61, the storage element is a shift register (Gauthier et al., FIG.1 51), as well as a data latch, and in view of the motivation of Claim 61, this claim is rejected.

As per Claim 63:

Dependent on Claim 49, when in test mode, the transmit storage element (Gauthier et al., FIG.1 51) provides the repeating pattern (column 3 lines 36-65), and in view of the motivation in Claim 61, the claim is rejected.

As per Claim 64:

Dependent on Claim 49, the repeating pattern of Gauthier et al., at $2^{15} - 1$ (column 3 line 67) is much larger than the data capacity of the storage element, which is 10 bits in length (FIG.2 51), and in view of the motivation of Claim 61, the claim is rejected.

As per Claim 65:

Dependent on Claim 61, the receive storage element stores each data bit (see Gauthier et al., FIG.1 51), and in view of the motivation of Claim 61, the claim is rejected.

As per Claim 68:

Dependent on Claim 61, the transmit storage element is loaded from another source other than data input (see Gauthier et al., column 4 lines 3-13), and in view of the motivation of Claim 61, the claim is rejected.

As per Claim 70:

Dependent on Claim 61, the comparison element (Gauthier et al. FIG.1 60) detects variation between the received patter (FIG.1 22) and the repeating pattern (FIG.1 58), and in view of the motivation of Claim 61, the claim is rejected.

35. Claim 69 is rejected under 35 U.S.C. 103(a) as being unpatentable over Makoto Koga, U.S. Patent No. 6222380, in view of Gauthier et al., U.S. Patent No. 5228042 as applied to Claim 61 above, and further in view of Johnson et al., U.S. Patent No. 6606041. Dependent on Claim 61, the claim limits the receive circuit to being loaded via a parallel receive input (Johnson et al., FIG.2 61, 49, 47), and in view of the motivation of Johnson previously stated, the claim is rejected.

36. Claims 71-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Makoto Koga, U.S. Patent No. 6222380, in view of Gauthier et al., U.S. Patent No. 5228042, as applied to Claim 70, and further in view of Maddux et al., U.S. Patent No. 6421801.

As per Claim 71:

The claim limits Claim 70 to transmitting the signal frequency as a multiple of the receiver frequency. Maddux et al., in column 5 lines 52-65 teaches this, and in the same lines describes the advantage as being easier to measure at the receiver side. One with

ordinary skill in the art at the time of the invention, motivated to improve testing of the circuit, would combine the references, and so the claims are rejected.

As per Claim 72:

Dependent on Claim 71, this claim sets the two frequencies to an equal period. This is already taught by Gauthier et al. in FIG.1 18 wherein the clock that drives both LFSRs is a common clock to each. And in view of the motivation previously stated, this claim is rejected.

As per Claim 73:

Dependent on Claim 71, this claim limits comparing patterns to multiple instances. This is already taught by Gauthier et al. in the Abstract wherein the testing occurs in a free-running mode, and so continues for an indefinite number of instances. And in view of the motivation previously stated, this claim is rejected.

As per Claim 74:

Dependent on Claim 73, this claim limits communicating comparison output back to the source (transmitter). This is already taught by Maddux et al.. in the Abstract wherein the testing occurs and the receiver feeds back error results to the transmitter. And in view of the motivation previously stated, this claim is rejected.

Claims 75 and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Makoto Koga, U.S. Patent No. 6222380, in view of Gauthier et al., U.S. Patent No. 5228042, as applied to Claim 70, and in view of Maddux et al., U.S. Patent No. 6421801 as applied to Claim 73 above, and further in view of Johnson et al., U.S. Patent No. 6606041. Dependent on Claim 73, both claims limit that wherein the receiver adjusts a

parameter affecting its reception of the receive data based on the comparison (see column 1 lines 33-67), and since the same parameter adjustment affects the other memories (same reference), a second receive data signal from a second memory will be affected by the same parameter adjustment. And so, based on the previous motivation for Johnson, both claims are rejected.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John P Trimmings whose telephone number is 703-305-0714. The examiner can normally be reached on weekdays, 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on 703-305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Spuy J. Lamoure
for*

Albert DeCady
Primary Examiner

John P. Trimmings
John P Trimmings
Examiner
Art Unit 2133

Application/Control Number: 09/976,170
Art Unit: 2133

Page 29

jpt